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ABSTRACT

The study reported in this paper investigated second language learners' ability to analyze new words without the use of context clues. The study focused on how confidence and accuracy increase or decrease with prior knowledge of a language and how availability of reading strategies can affect confidence or accuracy. Three groups of graduate students (eight Greek learners of English, eight native English-speakers, and two Greek-English bilinguals) each completed two tasks: a multiple-choice vocabulary test using decomposable words with possible explanations of their Latin or Greek origins; and a measure of confidence in each response in the first task. Two groups of decomposable stimuli were used, including: 12 Latinate and 12 Greek pseudo-words made of bound morphemes, in verb form, prefixed. Twelve real words of low frequency, some decomposable and some not, were used as distractors. Results suggest that (1) all subjects must have consciously used the lexical decomposition strategy; (2) all subjects did significantly better on words of Greek origin; and (3) monolingual subjects' confidence rates were much lower than their accuracy rates. Additional research on pseudo-words in different contexts is recommended, to determine whether increasing lexical background information affects accuracy or confidence. A brief bibliography and test data are appended. (MSE)

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LEXICAL DECOMPOSITION AS A STRATEGY FOR GUESSING UNKNOWN WORDS : USERS' COMPETENCE AND CONFIDENCE

by P.S. Yougiouklis

Introduction

Guessing from context has been widely researched during recent years and there are a lot of conflicting theories concerning how effective those strategies could be. A review of the literature reveals differences of opinion. There is disagreement concerning the relative importance of the various factors in reading comprehension. Davis (1972) is contended that knowledge of word meanings is one of the most important factors in reading comprehension and that context probably, but not necessarily, helps in guessing meanings of new words. Other researchers including Hatch (1979) and Gorman (1979) emphasise the importance of semantic and syntactic predictions and guessing. Ingram (1968) reports that there was no significant difference in accurate guesses in a test of fifteen items used first isolated and then in context. Bensoussan and Laufer (1984) claim that there seems to be no escape from explicit teaching and practicing vocabulary but, paradoxical it may sound, this may actually help students guess unkown words as in order to be able to guess from context you must have enough context to use. Van Parreren and Schouten-van Parreren (1981) claim that in addition to the improvement of reading comprehension, training the skill of determining word meanings from context may also be useful for vocabulary building, as the results of their experiment yielded the finding that a rather exhaustive and detailed search for the meaning of an unknown word (before checking it with a dictionary) 'rewarded' itself by a superior retention of the word. They also report that there is a certain hierarchical organisation of the levels at which a word can be guessed and a subject can act correctly on a certain level only if there is no problem on one of the lower levels. Their protocol analyses indicated that the syntactic is below the semantic, which is below the lexical, which is below the stylistic level. Clarke and Nation (1980) also describe a strategy that learners could follow when trying to infer the

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meaning of a word: First the learner is asked which part of speech the unknown word is, then to look at the word's immediate and wider context, then to guess and, finally, as the fifth step, the learner is recommended, amongst other things, to break up, if possible, the unknown word into its parts to see if the meaning of the prefix and the root could agree with the guess. This is done to avoid misinterpretation of the prefix and root, which might lead to misreading of the context in order to suit the faulty prefix and root analysis. They conclude that by leaving prefix and root analysis until last all the options are left open.

Perhaps the reason why Lexical Decomposition,(LDS),as a strategy of guessing word meanings has not been widely researched lies on exactly this kind of findings. However, Nation (1988) claims that because of borrowing and common source European languages share a lot of vocabulary, and therefore the meaning of a word could be predictable from its form, if its form and meaning happen to be similar to those of a mother tongue word. He reports that in a series of vocabulary tests of graded difficulty there was a subject who got his highest score in the most difficult test consisting of words of a scientific nature. This subject's first language was Spanish and he was able to use his NL knowledge to guess meanings of large numbers of words derived from Latin at this level (advanced and scientific level).

However, a guesser's lexical decision is a more complex process than it appears to be. It involves not only linguistic and psycholinguistic processes, but also complex psychological ones of various kinds concerning the reader's **confidence** in her guess, which could be crucial in her final decision. **Confidence** could be very important in the process of language learning as it might affect the extent to which people **learn** from their guesses.

Confidence is typically measured by asking the likelihood or probability that a prediction is correct and it is influenced by salient factors that people believe affect the accuracy of their prediction. A prototype of

this task is found in the study by Oskamp (1965) in which clinical psychologists answer multiple choice questions about a case study. The outcome was fixed and subjects had to decide the **probability** of the outcome, or, in terms of **confidence**, how **confident** they were about their judgement. Confidence judjements were made using the scale devised by Adams (1957) which defines confidence in terms of expected percentage of correct decisions. Since there were five alternatives for each test item, the scale began at 20% (representing a completely chance level of confidence) and extended to 100% (indicating absolute certainty of correctness). In addition to providing a clearly understood objective meaning for confidence, this scale has the advantage of allowing a direct comparison between the level of accuracy and the level of confidence. For example, if a judge got 28% of the items correct and had a mean confidence level of 40%, he could clearly be said to be overconfident. The results showed that subjects' **overconfidence** increases as the amount of information increases but not necessarily their **accuracy**. In another series of experiments Pitz (1974), Pickardt and Wallace (1974), and Peterson and Pitz (1986,1988) have exactly the opposite results: the level of **overconfidence** decreases while **accuracy** remains constant, or increases, when subjects have **prior knowledge** or receive more information about the quantity predicted! The explanation Pitz (1974) gives is that as knowledge increases, a person can think of additional plausible alternatives other than the predicted one and therefore her overconfidence decreases.

We thought that it would be very interesting to see how those theories could apply to guessing meanings of words generally, and more specifically by using the LDS. There is not any previous research, at least to our knowledge, on how **confident** people who guess unknown words are about their guessing; therefore we thought it was worth investigating - especially if we consider how important **confidence** could be in the process of language learning.

In this particular experiment, which is the first in a series, we followOskamp's model, and we consider as participants' **prior knowledge**

their knowledge of one or more of the languages to be investigated. We are not using any **increasing information**, in the form of external clues in the surrounding context, in this particular experiment as we want our subjects to concentrate on the analysis of the words themselves and not to use possible external clues of any kind. We are investigating how confidence and accuracy increase or decrease with this kind of information as well as how the subjects' availability of strategies could affect either their confidence or accuracy, or both. In other words, to what extend could the knowledge of both NL and TL affect the two above mentioned parameters?

There are three groups of subjects: (a) Greek learners of English (b) native speakers of English , and (c) bilingual Greek/English speakers, and we are investigating whether they have somewhere in their mental lexicon some correct basic meanings, so to speak, of various commonly used roots and prefixes of both Latin and Greek origin which could be used when trying to infer meanings of unknown words as well as how **confident** they are with this kind of guessing.

The hypotheses we put forward are:

Native speakers of Greek:

(a) They are expected to be better than native speakers of English at guessing meanings of words of a Greek origin because the former have, potentially, two types of strategy at their disposal: (a) Intralingual, involving strategies within TL where they can facilitate their guessing by generalising their previous knowledge of words in English and (b) Interlingual strategies, involving the NL, where they can transfer words from their NL which they think they are formally and/or semantically related to the unknown English word.

(b) As far as words of Latin origin are concerned: There are quite a few words of Latin origin- some of them of high frequency- in standard Greek and even more so in certain dialects- yet one cannot say that Latin is really part of the Greek language, as it is for English. Therefore, Greek subjects have got only Intralingual strategies

available and consequently they should not be expected to facilitate their guessing, unless linguists, perhaps.

(c) It was also hypothesised that the Greek group should be more confident than the English group with their guesses of Greek words, after they have recognised them as such, whereas much less confident on words of Latin origin because of their availability of strategies, or prior knowledge, again.

Native speakers of English

(a) Native speakers of English, on the other hand, have only one type of strategy available, the Intralingual. They can only generalise their knowledge of their NL to infer meanings of word elements of Greek origin. Therefore they are expected to be less good than the Greek subjects on words of Greek origin.

(b) Similarly, they have only NL strategies for guessing words of Latin origin but they are expected to be better than Greek subjects because morphemes and words of this kind are part of the English language and native speakers are likely to have a larger vocabulary of such words and therefore be more familiar with the relevant morphemes, especially when they are of high frequency.

(c) The confidence of the English group is expected to be higher for the Latin words as the amount of Latin words in English is higher than Greek; therefore they have more prior knowledge and they should be more confident, according to Oskamp's findings.

Bilingual Greek/English subjects

(a) The bilingual group were expected to be equally good, or even better than the Greek group on Greek words as they have the same strategies, both Interlingual and Intralingual as Greek subjects. Their strategies are also even more reinforced as both languages are their native languages.

(b) On Latin words they have only Intralingual strategies, just like the English group and therefore they are expected to be as good as they.

(c) Their confidence is expected to be equal or higher than the Greek group's on words of Greek origin for reasons explained above, and equal to the English subjects' on words of Latin origin.

Generally they are considered the most advantageous group, and therefore they are expected to have the best performance.
In our analysis we are investigating whether knowing meanings of parts of words could facilitate guessing of morphologically related new words as it does for learning. More specifically: Do Greek subjects do better than English on words of Greek origin? To what extent do all the subjects use the LDS, if they use it at all? We are also investigating how confident all the three groups are with their guessing in the two groups of words, Latin and Greek.

Method

Subjects

A total of 18 subjects participated, all postgraduate students at the University College of North Wales: 8 speakers of Greek -judged to be advanced in English, 8 speakers of English, and two bilingual. There were six males and two females in each of the first two groups, the bilinguals both being males. The numbers were imposed by the availability of Greek students of the specific category used in the experiment. None of the English students had any Latin or Greek at school, and none of the Greeks had done any Latin. Similarly the two bilingual subjects had done no Latin or Ancient Greek at school. They all were students of Science or Economics.

Materials and tasks

Two groups of decomposable stimuli were used. They consisted of 12 Latinate and 12 Greek pseudowords, none actually existing in either Greek or English; all of them were made of **bound morphemes**, i.e. neither of the two parts of each word occurs freely in speech. They were all in verb form, prefixed, and made of commonly used Latin and Greek morphemes. All the morphemes were used in a quite straightforward way to carry their usual meaning, i.e. non-idiomatic. That was done on the assumption that all the elements would be familiar to all subjects from other, real words they could have met , and therefore potentially available to make guesses with. Each prefix or stem appeared in two or more words. There was a third group of stimuli, consisting of 12 real words, some decomposable, some not, of low frequency, chosen on the basis of their Greek or Latin origin and which acted as distractors; their scope was not taken into account in the final processing of the data.

Two tasks were required of each subject. The first task was a multiple choice vocabulary test as used by Kaye et al (1987). Each decomposable word was paired with four possible definitions:

(a) Both parts, prefix and and stem, Correct, or (BC),
(b) Prefix only Correct, or (PC),
(c) Stem only Correct, or (SC),
(d) Nothing Correct-both parts completely incorrect- or (NC).

Let us consider some examples:

(I) LATIN: 1) **to consect** : (a) to cut together-(BC), (b) to train together-(PC) , (c) to cut against -(SC), (d) to train against-(NC) 2) **to conspect**:(a) to look together -(BC),(b) to breathe together -(PC) (c) to look against-(SC), (d) to breathe against -(NC)

II) GREEK: 1) **to hemipathise** (a) to half understand somebody's problems-(BC), (b) to half divide a path - (PC), (c) to suffer from a blood disease -(SC), (d) to create a path for the blood to flow through -(NC). 2) **to hemilyse** (a) to half decompose -(BC), (b) to borrow at half

the interest-(PC),(c) to decompose blood -(SC),(d) to borrow blood -(NC)

The incorrect part of the definition was held constant across instances of that morphemic unit throughout the entire list of words. For example, the incorrect meaning of **"-con"** was **"against"** and that was used in the Stem only Correct (SC) definition for all words containing the prefix **"con"**. If the incorrect definition of word parts varied this would give the subjects another clue to rule out response alternatives, but one that is not related to knowing the correct definitions as Kaye et al (1987) point out.

A similar process was followed for the existing decomposable stimuli. The second task measured how **confident** the subjects were of their judgement: After making each **meaning/correct** choice, they were asked to specify the degree of their confidence on the following five-point scale: 0 = I am extremely unsure, 1 = I am rather unsure, 2 = I am between sure and unsure, 3 = I am reasonably sure, 4 = I am absolutely sure.

Design

The design was three subject groups with repeated measures across two types of words. Dependent variables for each subject measured were scored fully correct, correct prefix only, correct stem only, as well as mean confidence.

Procedure

The three groups of participants were randomised so as to avoid two Greek - NL subjects, or, two English - NL subjects sitting together. The order of the Latin or Greek stimuli, pseudo or existing, decomposable or not, were randomised and the same was done for the multiple choice questions.

Each subject received a booklet with instructions and the test. They were not told that the items in the test were pseudowords; besides, that

was the reason why the distractors were used. The 'pseudowords' must have been quite convincing, because even the native speakers did not recognise them as non existing.

The participants were asked to work consecutively through the two tasks and not to omit any questions. A twenty minute period was allotted for testing. All participants completed the test.

Confidence judgements

We adopted the following for the assessment of the data: For accuracy each question was marked:3 for (BC) answers, 1.5 for either (PC) or (SC), and 0 for (NC), i.e. the maximum should be 36.000 for the twelve items. For the confidence each question was marked as explained above on a five point scale, i.e the maximum should be 48.00 for the twelve items. In order to simplify the process of comparison we converted the results into percentages (see the graphs).

Results

We first computed descriptive statistics and analyses of variances on repeated measures of two types (a) **accuracy** and (b) **confidence**.

The analysis of variance (MANOVA) in the SPSS computing package of the accuracy data revealed a highly significant effect for the languages, Latin or Greek, p=.000, while there was no significant difference of accurate guesses overall between groups of subjects, p=.797. Similarly, there was no significant interaction for the three groups -Greek, English, and bilingual- concerning their performance on Greek or Latin words.

The MANOVA for the confidence data showed a highly significant effect of the language, Latin or Greek, p = 000, but no significant difference in confidence overall between the groups of subjects, p=.410. However, there was a significant, yet not high, interaction for the three groups of subjects concerning their performance on the two groups of words, p=.006.

Discussion

Group performance on words of Greek origin

It is clear from the results that although the Greek group potentially had two types of strategies to make guesses with, they did not perform significantly better than the English group on words of Greek origin. Their mean accuracy was 30.00 out of 36.00, or 83.30%, while the English group's was 29.81 out of 36.00, or 82.80%, and the bilingual's 32.25 and 89.58% respectively.

With such results we cannot really talk about highly significant differences; however, the Greek group could have performed much better or even reached complete success, if they were aware of all the conventions of transliteration of Greek words into English. For example, from the 16 occurrences of the prefix "homo=same" they got four wrong. If the subjects were consciously aware of facts like the transliteration of the Greek sign of aspiration " " into [h] as in "helicopter", "hypothesis" and "hypertension", they might have had a 100% success. The same could count as a counter-argument for the English subjects: they are aware of all the orthographic and transliteration conventions of their language, plus the fact that as postgrad students they are likely to have met quite a few words of Greek origin in scientific texts, besides the commonly used ones. Similarly, the bilingual group were able to perform best of all the three groups because they had the sum of the strategies the other two groups had. However, they were not significantly better than the other two groups, perhaps because all the groups achieved such high scores.very close to maximum accuracy, that differences could not really be significant. This apparent success on words of Greek origin might be due to the fact that Greek words are both morphologically and semantically less complex than Latinate words.

Now, as far as confidence is concerned, the Greek group's mean was 32.50 out of 48.00, or 67.70%, the English group's 24.125, or 50.26, and the bilingual group's 41.000 or 85.42% respectively.

It is obvious that the Greek group's confidence, despite our prediction, is not as high as their accuracy: mean accuracy 83.30% - mean confidence 67.70%, that is they are clearly underconfident. These results seem to be consistent with Peterson and Pitz's studies, where prior information causes *accuracy* to increase and *overconfidence* to decrease. All this could be explained either by Pitz's (1974) theory, i.e.the more information the more plausible alternatives, or by the fact that Greek subjects, knowing about the existence of "false cognates" which are so often a headache, have decided that their predictions are very likely to be wrong. Yet, the hypothesis seems to be justified by the results of the English group: they are the least confident of all, although very close in accuracy: mean accuracy 82.80%-mean confidence 50.26%. Probably the English group's lack of Interlingual strategies has caused them to be very unsure about their guessing, i.e. underconfident The difference between their confidence and accuracy is really striking. Furthemore, they are very likely to have recognised the words as "Greek" -the researcher was Greek and there were also Greek subjects participating- and the saying "it's all Greek to me" might have affected their confidence. The bilingual group's performance has justified the hypothesis: their availability of strategies has positively affected both their accuracy and confidence: mean accuracy 89.58%-mean confidence 85.425, that is they ideally covary.

Group performance on words of Latin origin

The most prominent finding here is that all the three groups were both significantly less accurate and less confident than on the Greek words. Their **mean accuracy** was 20.813 out of 48.00, or 57.80% for the Greek group, 23.063, or 64.06% for the English group, and 21.000, or 58.305 for the bilingual group.

Those results were more or less as predicted for the Greek group but totally unexpected for the other two groups. The most obvious explanation could be the fact that Latinate words are both morphologically and semantically more complex than the Greek words as

they have completely merged into the English language, and their meaning is very often idiomatic. Therefore, the fact that both the English and the bilingual groups had more strategies, or more prior knowledge, did not considerably affect their accuracy.

The confidence results were 15.625 out of 36.00, or 32.55% for the Greek group, 19.500, or 40.60% for the English, and 23.500, or 49% for the bilingual group.

As expected, lack of strategies, or lack of prior knowledge, has caused such low mean confidence for the Greek group. However, the fact that the English group had more information, in the form of prior knowledge, seems to have affected their confidence negatively! Their mean accuracy is 64.06% while their mean confidence is 40.60%. Those results are consistent with Peterson and Pitz's (1986,1988) where more information causes accuracy to remain constant or to increase, but overconfidence to decrease. On the other hand, the bilingual group's accuracy and confidence seem to covary quite harmonically: their mean accuracy is 58.30% and confidence 50%. As Peterson and Pitz(1988) point out, if people are aware of the factors that do influence accuracy then confidence and accuracy will covary. This seems to be the case with the bilingual group on both groups of words, Greek and Latinate. Yet, the small sample should not allow us to make careless generalizations.

Conclusion

Regardless of whether the task was ideal or not, some clear-cut conclusions can be drawn :(a) All the subjects must have used the LDS quite consciously because they have quite high average scores - that was not the case with Kay and Fonseca's (1988) results where subjects did not seem to be using the LDS consciously. (b) All the subjects did significantly better, almost perfectly, on words of Greek origin than on Latinate ones and they were more confident, too. This could explain why Greek subjects did not have the chance to perform significantly better than the English group (c) Clearly, English and Greek subjects' confidence rates were so much lower than those of accuracy that they

could easily be called underconfident in their judgements. This is in opposition to Lichtenstein et al.'s (1982), Oskamp's (1965), and Ryback's (1967) findings that yielded the result that people tend to be overconfident. Here we have exactly the opposite results which seem to be more consistent with Peterson and Pitz's findings.

The next step now is to test more pseudowords in different kinds of context in order to see whether the two parameters are affected with increasing information of this kind.

References

ADAMS, J.K.(1957) A confidence scale defined in terms of expected percentages. *American Journal of Psychology,* 70, pp.423-436

BENSOUSSAN, M.,& LAUFER, B> (1984). Lexical guessing in context in EFL reading comprehension, *Journal of research in Reading,* 7 (1), pp.15-32

CLARKE, D.F., & NATION, I.S.P. (1980). Guessing of meanings of words from context: strategy and techniques.*System,* 8 (3), pp.211-220

DAVIS, F.(1972) Psychometric in comprehension in reading. *Reading Research Quartely,* 7, 628-678

GORMAN, T.P.(1979) Teaching reading at the advanced level. In M. Celce-Muria and L. McIntosh (Eds). *Teaching English as a second or a foreign language.* Rowley, MA: Newbury House, pp. 154-161

HATCH, E.(1979) Reading a second language. In M.Celce-Muria and L. McIntosh (Eds). *Teaching English as a second or a foreign language.* Rowley, MA: Newbury House, pp. 129-144.

INGRAM, E. (1968) Attainment and diagnostic. In A.Davies (Ed) *Language Testing Symposium : A Psycholinguistic Approach.* London: O.U.P. pp.70-97

KAYE, D.B., STERNBERG, R.J., & FONSECA, L.(1987) Verbal comprehension: the lexical decomposition strategy to define unfamiliar words. *Intelligence,* 11, pp.1-20

LICHTENSTEIN, S.,FISCHHOFF, B.,& PHILIPS, L.D.(1982) Calibration of probabilities:the state of the art as of 1980. In D. Kahenman, P. Slovic,& A. Tversky (Eds) *Judgement under uncertainty: Heuristics and biases,* pp. 306-334

NATION, I.S.P.(1988) *Teaching and Learning Vocabulary.*New Zealand: Victoria University of Wellington, pp.40

OSKAMP, S.(1965) Overconfidence in case-study judgements.*Journal of Consulting Psychology,* 29(3), pp.261-265

PETERSON, D.N.,& PITZ, G.F.(1986) Effects of amount of information on predictions of uncertain quantities. *Acta Psychologica,* 61, pp.229-241

PETERSON, D.N., & PITZ, G,F. (1988) Confidence, Uncertainty, and the use of information. *Journal of Experimental Psychology: Learning, Memory, and Cognition,* 14(1), pp. 85-92

PICKARDT, R.C., & WALLACE, J.B.(1974) A study of the performance of subjective probability assessors. *Decision Sciences,* 5, pp.347-363

PITZ, G.F.(1974) Subjective probability distributions for imperfectly unknown quantities. In L.W. Gregg (Ed), *Knowledge and Cognition.* New York: Wiley.

RYBACK,D.(1967) Confidence and accuracy as a function of experience in judgement making in the absence of systematic feedback. *Perceptual and Motor Skills,* 25, pp.331-334

VAN PARREREN C.F., & SCHOUTEN- VAN PARREREN (1981) Contextual guessing: A trainable reader strategy. *System,* 9(3), pp.235-241

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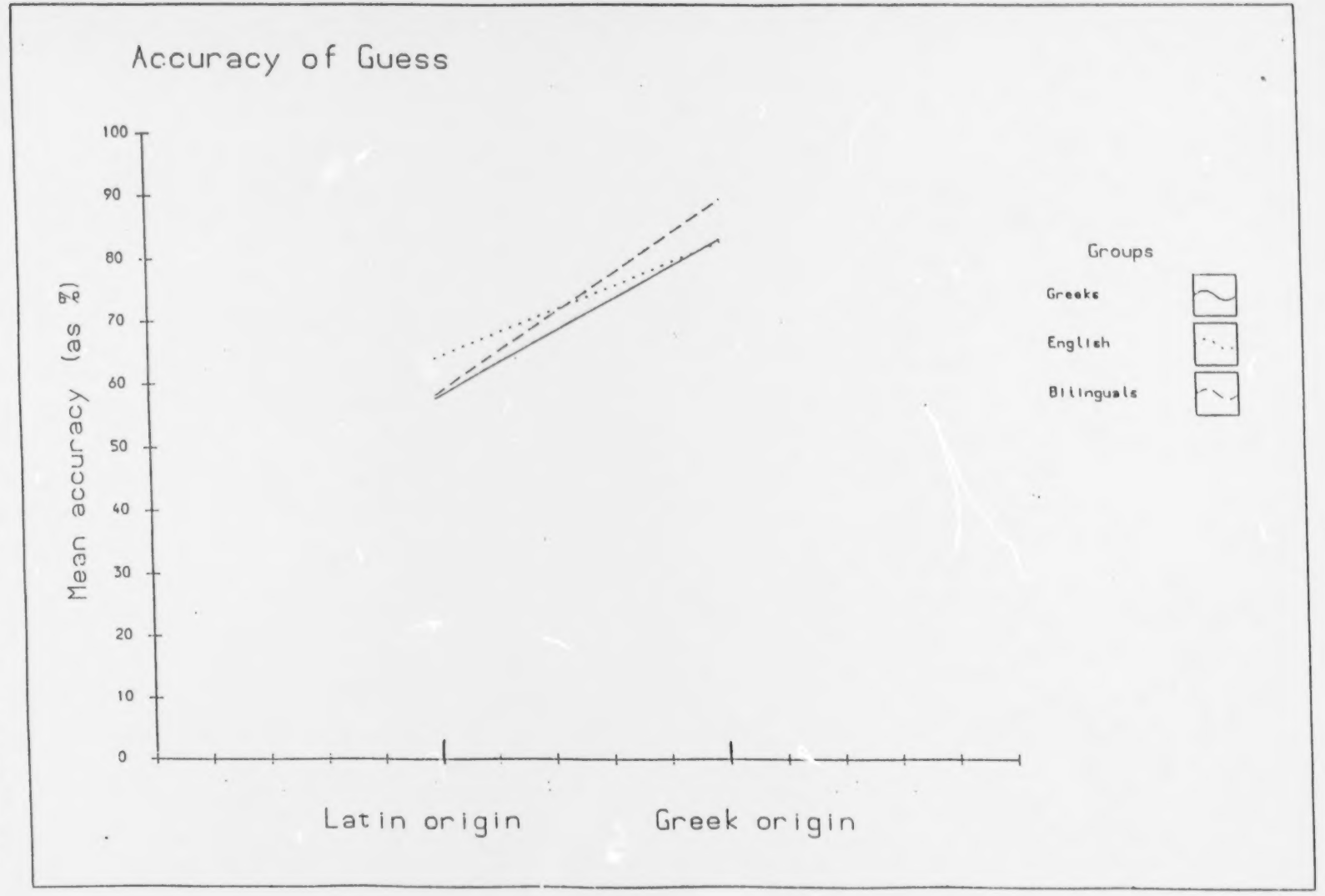

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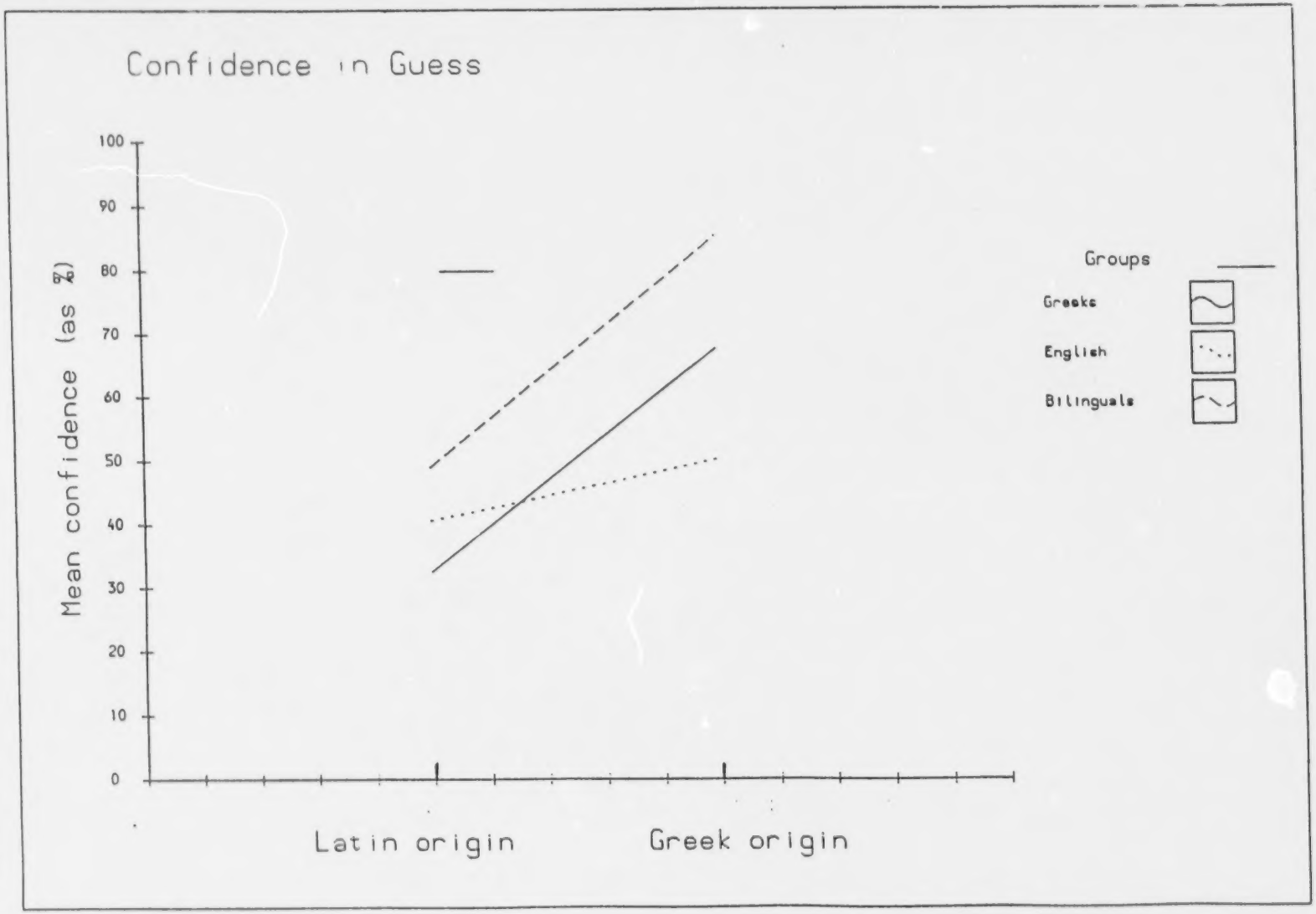

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Cell Means and Standard Deviations
Variable .. LATCORR

FACTOR	CODE	Mean	Std. Dev.
GR	1	20.813	4.906
GR	2	23.063	3.200
GR	3	21.000	4.243
For entire sample		21.833	4.091

Variable .. GRCORR

FACTOR	CODE	Mean	Std. Dev.
GR	1	30.000	2.891
GR	2	29.813	4.350
GR	3	32.250	5.303
For entire sample		30.167	3.670

Tests involving 'LANG' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	147.80	15	9.85		
LANG	492.77	1	492.77	50.01	.000
GR BY LANG	21.45	2	10.73	1.09	.362

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Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	333.98	15	22.27		
GR	10.27	2	5.13	.23	.797

18 cases accepted.
0 cases rejected because of out-of-range factor values.
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Cell Means and Standard Deviations
Variable .. LATCONF

FACTOR	CODE	Mean	Std. Dev.
GR	1	15.625	10.028
GR	2	19.500	8.880
GR	3	23.500	3.536
For entire sample		18.222	9.046

- -

Variable .. GRCONF

FACTOR	CODE	Mean	Std. Dev.
GR	1	32.500	13.554
GR	2	24.125	10.616
GR	3	41.000	5.657
For entire sample		29.722	12.541

- -

Tests involving 'LANG' Within-Subject Effect.

Tests of Significance for T2 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	613.62	15	40.91		
LANG	1014.00	1	1014.00	24.79	.000
GR BY LANG	340.63	2	170.31	4.16	.036

4112 bytes of memory are needed for MANOVA execution.

Tests of Between-Subjects Effects.

Tests of Significance for T1 using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	2761.63	15	184.11		
GR	348.85	2	174.42	.95	.410